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EXAMINER	
OSINSKI, MICHAEL S	

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2622	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/597,794	Applicant(s) KUMAGAI ET AL.
	Examiner MICHAEL OSINSKI	Art Unit 2622

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 October 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,5,7-9 and 11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 5, 7-9, and 11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *24 September 2009* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This following Office action is in response to communications filed on 10/5/2010. Claims 1, 5, 7-9, and 11 are currently pending within this application.

Response to Arguments

2. The Applicant's arguments regarding the claims have been fully considered but are moot in view of new ground(s) of rejection necessitated by Applicant's amendments to the claims.

Claim Rejections – 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. ***Claims 1 and 11 are rejected under 35 U.S.C 103 as being unpatentable over Nonaka et al. (US Patent 7,162,151) [hereafter Nonaka] in view of Freeman (US PGPub 2005/0280714) [hereafter Freeman] and Ono (US Patent 7,456,874) [hereafter Ono].***

5. As to claim 1, Nonaka teaches a multi-eye imaging apparatus (Fig. 1) that comprises a plurality of imaging systems including a first imaging system (lens,

11, CCD 12, and actuator 21) and a second imaging system (lens 16 and CCD 17), each imaging system including an optical system (11and 16) and an imaging element (12 and 17) and having different optical axes (as shown in Fig. 1), wherein the first imaging system includes a shifter (actuator 21) that changes a first relative positional relationship between an image of a subject (110) formed on the imaging element (12) of the first imaging system and the imaging element of the first imaging system during a time-series image capture (camera operation of Fig. 3 where images I0-I1 are captured in continuous time-series during exposure of the CCD of the first imaging system), and the second imaging system (16 and 17) has a second relative positional relationship between an image of a subject (110) formed on the imaging element (17) of the second imaging system and the imaging element of the second imaging system that is fixed during time-series image capture (Col. 3, 29-53, Col. 4, 47-59), an image memory (recording section 15 and image memory 19a) that accumulates a plurality of frames of image information captured in the time series from the first and second imaging systems (image frames I0-I1 captured by the second imaging system are placed within image memory 19a and recorded images captured by the first imaging system are placed within recording section 15 during the camera imaging operations shown in Fig. 3), a camera shake detection section (19) that obtains a shake amount (X1-X3 shown in Fig. 2) by comparing the plurality of frames of image information accumulated in the image memory captured in the time series and comprises a comparison section (19b), moving direction calculation section (19c), and a moving amount calculation

section (19d) (Col. 4, 9-46, Col. 6, 26-34), a parallax amount obtaining unit (calculation control section 25) that obtains a magnitude of a parallax from images captured by first and second various imaging systems (Col. 7, 63-67, Col. 8, 1-6), an optimal image selecting unit (calculation control section 25) that selects a combination of image information from the plurality of frames of image information in the image memory, captured in the time series from the first imaging system and the second imaging system (Col. 4, 19-21, 26-39, the calculation control section selects images I0-I1 captured during the time-series and stored within the image memory 19a part of the image memory to be combined), and an image combining unit (image processing/forming section 22) configured to combine the selected combination of the image information (Col. 6, 26-34, the image processing/forming section synthesizes the image signals captured by the second imaging system and selected by the calculation control section stored within the image memory upon one another (shown in Fig. 5, 24b), corresponding to combining the plurality of selected frames of the image memory).

It is however noted that Nonaka fails to particularly disclose a shifter that changes a relative positional relationship in a fixed change amount between an image formed on an imaging element and the imaging element, and an optimal image selecting unit that selects a combination of image information so that a resolution of a combined image information is higher than that of each of the plurality of frames of image information.

On the other hand, Freeman discloses an imaging apparatus (Fig. 1, image enhancement system 100) that comprises a shifter (actuator 122 and optical compensator 108) that changes a first relative positional relationship in a fixed change amount (1/10 or 1/100 of a pixel length or width or any similar value to achieve a desired sub-pixel offset) between an image (102) formed on an imaging element (photodetector 104) and the imaging element (104) during a time-series image capture (Page 2, 0029, Page 3, 0030-0031, Page 4, 0038, as shown in Figs. 3A-3D, an actuator controls the movement of an optical compensator during image capture in order to change the positional relationship between an image 202 formed on the pixel array 200 and the pixel array, shown in transition from Fig. 3A to Fig. 3B for example, by a fixed amount such as 1/10 or 1/110 of a pixel in the X or Y directions), and an optimal image selecting unit (resolution enhancement system 124) that selects a combination of image information from a plurality of frames of image information in an image memory (storage medium of system 124) captured in the time series so that a resolution of a combined image information is higher than that of each of the plurality of frames of image information (Page 3, 0031, Page 5, 0046, 0048-0049, images captured during an imaging operation/time-series and stored within the storage medium of the system 124 are selected for combination in order to create an enhanced resolution image from the captured frames of image information), and an image combining unit (super resolution image processor 302) configured to combine the selected combination of image information (Page 4, 0040, Page 5,

0048, 0052, the selected images are provided to and combined within the super resolution image processor in order to form an enhanced resolution image).

It would have been obvious to one having ordinary skill in the art at the time of invention to include a shifter that changes a relative positional relationship in a fixed change amount between an image formed on an imaging element and the imaging element and an optimal image selecting unit that selects a combination of image information so that a resolution of a combined image information is higher than that of each of the plurality of frames of image information as taught by Freeman with the multi-eye imaging apparatus of Nonaka because the prior art are directed towards imaging devices equipped to change the positional relationship between an image formed on an imaging element and the imaging element and combine the shifted images and because all the claimed limitations are disclosed within the cited prior art and would enable the multi-eye imaging apparatus of Nonaka to form an enhanced resolution image by controlling the shifting amount of the position of the image on the imaging element by a particular amount providing continuity between the images and combining images determined by a selecting unit to provide a quality enhanced resolution image.

Additionally, it is noted that the combination of the Nonaka and Freeman references fail to particularly disclose a parallax amount obtaining unit that obtains a magnitude of parallax from image stored within an image memory.

On the other hand, Ono discloses a multi-eye imaging apparatus (Fig. 1) that comprises a parallax amount obtaining unit (control unit 50, depth

information extractor 62) that obtains a magnitude of parallax from images (parallactic images) stored within an image memory (memory 40) (Col. 3, 55-59, 65-67, Col. 4, 1-17, 30-40, Col. 6, 56-67, Col. 7, 1-6, parallactic image data comprising of a plurality of images of a subject captured at various viewpoints are stored within an image memory and supplied to a control unit and a depth information extractor thereof where the parallactic images are analyzed by the depth information extractor in order to obtain a parallax amount).

It would have been obvious to one having ordinary skill in the art at the time of invention to include a parallax amount obtaining unit that obtains a magnitude of parallax from image stored within an image memory as taught by Ono with the above combination of Nonaka and Freeman because the prior art are directed towards imaging devices that detect an amount of parallax from image information and because all the claimed limitations are disclosed within the prior art and would enable the multi-eye imaging apparatus of Nonaka and Freeman to obtain a parallax amount from the images stored within the image memory thus enabling information regarding the parallax between the stored images to be recognized and used to dictate subsequent combination or processing operations performed by the imaging apparatus.

6. As to claim 11, Freeman discloses the shifter (actuator 122 and optical compensator 108) changes the first relative positional relationship using only the fixed change amount (Page 3, 0031, Page 5, 0048-0049, only the fixed change

amount that provides the desired sub-pixel offset of the image upon the sensor array is used during the imaging process).

7. ***Claim 5 is rejected under 35 U.S.C 103 as being unpatentable over Nonaka et al. (US Patent 7,162,151) [hereafter Nonaka] and Freeman (US PGPub 2005/0280714) [hereafter Freeman] and Ono (US Patent 7,456,874) [hereafter Ono], as applied to claim 1, in further view of Yamasaki (US PGPub 2003/0071905) [hereafter Yamasaki] and Kawahara (US Patent 7,095,001) [hereafter Kawahara].***

8. As to claim 5, it is noted that the combination of Nonaka, Freeman, and Ono fails to particularly disclose the image combining unit corrects and combines the images based on the parallax amount obtained by the parallax amount obtaining unit.

On the other hand, Yamasaki discloses an image processing method (Fig. 10) that includes selecting image information (Fig. 9) captured by an image sensing unit (Figs. 2-7) to be used in the combination of the image information (performed at s310) based on the amount of parallax calculated (performed at s302) (Page 3, 0057, -0058, Page 4, 0080, Page 5, 0082-0084, 0088-0092, Page 6, 0093-0094, 0099, the amount of parallax between captured images is calculated and based on the result, the images are modified/shifted in order to compensate for the parallax and the subsequent shifted image data are then combined to form a single composite image).

It would have been obvious to one having ordinary skill in the art at the time of invention to correct and combine captured and stored images based on an obtained parallax amount as taught by Yamasaki with the multi-eye imaging apparatus of Nonaka, modified with the teachings of Freeman and Ono, because the prior art are directed towards imaging apparatuses that combine captured image information wherein the image information have determined parallax amounts and because all the claimed limitations are disclosed within the cited prior art and would enable the device of Nonaka to select specific stored image information for combination with each other to produce an image with increased resolution through the synthesizing of the images, performed by the forming section 22, and choose the respective images for combination by taking into account the parallax amount due to the images being formed on the various image sensors with varying optical axes increasing the accuracy of the selection of images best suited for combination.

Also, it is noted that the combination of the Nonaka, Freeman, Ono, and Yamasaki references fail to particularly disclose the image combining unit corrects and combines the images based on the shake amount obtained by the shake amount obtaining unit.

On the other hand, Kawahara discloses an image sensing apparatus (Fig. 10) that performs image blur correction and includes an optimal image selecting means (coordinate converter 173) for selecting image information which is used in the combination of the image combining means (image combiner 174) from image information captured by an imaging system (image sensing device 161)

accumulated within an image memory (171) based on a shake amount obtained by a shake amount , Col. 6, 1-obtaining means (shift detector 172) (Col. 2, 38-40, Col. 3, 26-39, Col. 4, 3-13, 39-44, 60-67, Col. 5, 33-47, 57-67, Col. 6, 1-20, the coordinate converter selects image information to be combined by the image combiner for each image stored within the image memory by shifting coordinates of a feature point within the images to have the same values wherein the extraction/designation of features points and corresponding shifting of the image data are performed based on the amount of shift/difference detected by the shift detector of the extracted feature point, caused by camera shake, detected through image comparison).

It would have been obvious to one having ordinary skill in the art at the time of invention to correct and combine captured and stored images based on a shake amount obtained by a shake amount obtaining unit as taught by Kawahara with the multi-eye imaging apparatus of Nonaka, modified with the teachings of Freeman, Ono, and Yamasaki, because the prior art are directed towards imaging apparatuses that combine captured image information where the image information contain determined shake amounts and because the claimed limitations are disclosed within the prior art and would enable the device of Nonaka to select specific stored image information for combination with each other to produce an image with increased resolution through the synthesizing of the images, performed by the forming section 22, that is additionally unaffected by blurring effects caused by camera shake based on the amount of shake detected by the shake detecting section of Nonaka.

9. ***Claims 7-8 are rejected under 35 U.S.C 103 as being unpatentable over Nonaka et al. (US Patent 7,162,151) [hereafter Nonaka] and Freeman (US PGPub 2005/0280714) [hereafter Freeman] and Ono (US Patent 7,456,874) [hereafter Ono], as applied to claim 1, in further view of Nakazono (Japanese Patent Publication 2003-134385) [hereafter Nakazono].***

10. As to claim 7, it is noted that the combination of the Nonaka, Freeman, and Ono references fails to particularly disclose a discriminating unit for discriminating different subjects wherein the shake amount obtaining unit obtains a shake amount for each of the different subjects and the image combining unit combines images for each of the different subjects.

On the other hand, Nakazono teaches a camera (Fig. 1) that captures an image using a CCD imager (1) and using an image composition device (4) that comprises a motion vector detecting element (Fig. 2, 11, Fig. 3) that uses two pictures to discriminate subject images (Fig. 5) and determines a shake amount for the subject using a motion vector calculation part (Fig. 3, 23) and the two images used to determine a shake amount of the subject of the image are combined (Fig. 15) into an output image using a synthesizing means (Fig. 14, 92) (Page 11, 0056-0058, Page 12, 0059-0060, Page 16, 0073-0075).

It would have been obvious to one having ordinary skill in the art at the time of invention to discriminate subjects of an image and obtain shaking amounts of the identified subjects as taught by Nakazono with the multi-eye

imaging apparatus of Nonaka, modified with the teachings of Freeman and Ono, because the prior art are directed towards imaging devices that eliminate image shaking effects and because the claimed limitations are disclosed within the cited prior art and because obtaining shake amounts, or movement amounts, of an imaged subject between two images would allow the device of Nonaka to determine an image shake amount for an image's subject as opposed to the entire image in order to compensate for an image where the subject itself is moving as opposed to the physical camera, and combining the images would result in an image free from shaking or blurring effects .

11. As to claim 8, the Nakazono reference discloses all claimed subject matter with regards to similar comments of claim 7. Additionally, Nakazono teaches a division unit for dividing image information into a plurality of blocks (Fig. 8) and obtaining a shake amount for a plurality of blocks using block setting means (Fig. 3, 22) (Page 13, 0064-0065).

12. ***Claim 9 is rejected under 35 U.S.C 103 as being unpatentable over Nonaka et al. (US Patent 7,162,151) [hereafter Nonaka] and Freeman (US PGPub 2005/0280714) [hereafter Freeman] and Ono (US Patent 7,456,874) [hereafter Ono], as applied to claim 1, in further view of Yamasaki (US PGPub 2003/0071905) [hereafter Yamasaki].***

13. As to claim 9, Nonaka teaches the optical photographing lens (11) forms a main image of a subject (110) onto an image sensor (12), which captures all incident light and corresponding colors, and that light receiving lens (16) receives reflected luminous flux from the subject and an image sensor (17), which also captures all incident light and corresponding colors, is used to form images based on the reflected luminous flux and subsequently these images are used to determine moving direction of the image sensor (12) (Col. 3, 42-53, 66-67, Col. 4, 1-8, 20-28).

It is however noted that the combination of the Nonaka, Freeman, and Ono references fails to particularly disclose an imaging system for handling a red color, an imaging system for handling a green color, and an imaging system for handling a blue color, wherein for at least one corresponding to one color of the imaging systems corresponding to the respective colors, the number of the imaging systems corresponding to the one color is two or more, and the two or more imaging systems for handling the one color include the first imaging system and the second imaging system.

On the other hand, Yamasaki discloses an image sensing unit (Figs. 2-6) with a plurality of imaging systems having different optical axes composed of an imaging system (aperture 205b, filter 206b and sensing region 204b) for handing a red color, an imaging system (apertures 205a and 205d, filters 206a and 206d, and sensing regions 204a and 204d) for handling a green color, and an imaging system (aperture 205c, filter 206c and sensing region 204c) for handling a blue color, wherein for at least one corresponding to one color of the imaging systems

corresponding to the respective colors, the number of imaging systems corresponding to the one color (green) is two or more (Page 3, 0057-0060) and the two or more imaging systems for handling the one color (green) include the first imaging system and the second imaging system (Page 4, 0080, Page 5, 0082-0083).

It would have been obvious to one having ordinary skill in the art at the time of invention to include an imaging system for handling a red color, an imaging system for handling a green color, and an imaging system for handling a blue color, wherein for at least one corresponding to one color of the imaging systems corresponding to the respective colors, the number of the imaging systems corresponding to the one color is two or more, and the two or more imaging systems for handling the one color include the first imaging system and the second imaging system as taught by Yamasaki with the multi-eye imaging apparatus of Nonaka, modified with the teachings of Freeman and Ono, because the prior art are directed towards imaging apparatuses with imaging systems having different optical axes that combine captured image information wherein the image information have determined parallax amounts and because all the claimed limitations are disclosed within the cited prior art and would enable an imaged scene to be captured according to a plurality of different colors where each color is handled by a respective imaging system thus expanding the color information of the imaged scene capable of being captured by the imaging apparatus.

Conclusion

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Osinski whose telephone number is (571) 270-3949. The examiner can normally be reached on Monday to Thursday 9 a.m. to 6 p.m. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MO

/MICHAEL OSINSKI/

Examiner, Art Unit 2622

/Jason Chan/

Supervisory Patent Examiner, Art Unit 2622